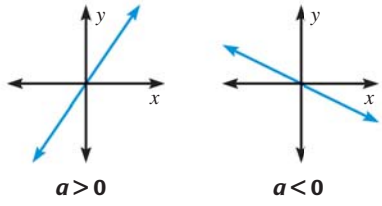
KEY CONCEPT *For Your Notebook*

Properties of Graphs of Direct Variation Equations

- The graph of a direct variation equation is a line through the origin.
- The slope of the graph of $y = ax$ is a.



TAKS

EXAMPLE 4 TAKS REASONING: Multi-Step Problem

ANOTHER WAY
For alternative methods for solving Example 4, turn to page 260 for the **Problem Solving Workshop**.

SALTWATER AQUARIUM The number s of tablespoons of sea salt needed in a saltwater fish tank varies directly with the number w of gallons of water in the tank. A pet shop owner recommends adding 100 tablespoons of sea salt to a 20 gallon tank.

- Write a direct variation equation that relates w and s.
- How many tablespoons of salt should be added to a 30 gallon saltwater fish tank?

Solution

STEP 1 **Write** a direct variation equation. Because s varies directly with w, you can use the equation $s = aw$. Also use the fact that $s = 100$ when $w = 20$.

$s = aw$ **Write direct variation equation.**

$100 = a(20)$ **Substitute.**

$5 = a$ **Solve for a.**

RECOGNIZE RATE OF CHANGE
The value of a in Example 4 is a rate of change: 5 tablespoons of sea salt per gallon of water.

▶ A direct variation equation that relates w and s is $s = 5w$.

STEP 2 **Find** the number of tablespoons of salt that should be added to a 30 gallon saltwater fish tank. Use your direct variation equation from Step 1.

$s = 5w$ **Write direct variation equation.**

$s = 5(30)$ **Substitute 30 for w.**

$s = 150$ **Simplify.**

▶ You should add 150 tablespoons of salt to a 30 gallon fish tank.

✓ GUIDED PRACTICE for Example 4

6. WHAT IF? In Example 4, suppose the fish tank is a 25 gallon tank. How many tablespoons of salt should be added to the tank?